UNITED STATES DEPARTMENT OF COMMERCE
Unit d States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/559,749	04/27/00	IMOEHL	W 05125~~6~~065 RE

009629
MORGAN, LEWIS & BOCKIUS
1800 M STREET NW
WASHINGTON DC 20036-5869

QM12/0509

EXAMINER	
~~COMPTON, E~~	

ART UNIT	PAPER NUMBER
~~3726~~	5

DATE MAILED: 05/09/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary	Application No. 09/559,749	Applicant(s) Imoehl
	Examiner Eric Compton	Art Unit 3726

-- Th MAILING DATE of this c mmunication appears on th cover sheet with th correspondenc addr ss --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-10 is/are pending in the applica

4a) Of the above, claim(s) _____ is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-10 is/are rejected.

7) ☒ Claim(s) 8-10 is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 4

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "grinding tool" recited in claims 5-7 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

2. The drawings are objected to because in Figure 1, it is unclear as to what element the reference numeral "78" is pointing to. Clarification is needed.

Specification

3. The disclosure is objected to because of the following informalities: page 4, line 19, "a" should read --A-- and page 9, lines 17, "that" should read --than--.

Appropriate correction is required. Applicant is encouraged to reread the specification thoroughly and make additional corrections as appropriate.

Claim Objections

4. Claims 8-10 are objected to for not having proper antecedent basis in the specification for a select finish of either 0.2, 0.4, or 0.5 micrometers. Applicant is recommended to amend the specification to provide proper antecedent basis. No new matter should be entered.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, and 5, are rejected under 35 U.S.C. 102(b) as being anticipated by JP 60-019957 to Yuji (JAPAN ELECTRONIC CONTROL SYST CO LTD).

Yuji disclose a fuel injector value seat having an orifice portion (14) proximate a downstream face and having a first transverse cross-sectional area, a sealing portion (13) proximate an upstream face and having a second cross-sectional area, and a transition portion (15) interposed between the orifice portion and the sealing portion.

Figures 2 and 3 show the sealing portion and the transition portion decreasing from one area to another and the conical surfaces inherently have an included angle. Furthermore, the first angle is clearly greater than the second angle.

The flow characteristics (i.e. fluid dynamics) of the fuel injector are based on geometrical variables (e.g. cross-sectional areas, lengths, diameters, angles, etc.). Therefore, prior to forming a fuel injector, it is inherent that these variables have been predetermined by the designer(s) to yield specific flow characteristics in the finish product.

Regarding claims 1 and 2, it is inherent that one of ordinary skill in the art is capable of forming the fuel injector seat of Yuji.

Regarding claim 5, Yuji disclose that the sealing portion (13) is finally processed by grinding or lapping.

7. Claims 1 and 2, are rejected under 35 U.S.C. 102(b) as being anticipated by GB 2 029 508 to Claxton.

Claxton et al disclose a fuel injector having a needle valve (107), a seat having a needle valve sealing portion (126), orifice portion (132), and a transition portion (144) interposed between the orifice portion and the needle-sealing portion.

Figure 3 shows the sealing portion and the transition portion decreasing from one area to another and the conical surfaces inherently have an included angle. Furthermore, the first angle is clearly greater than the second angle.

The flow characteristics (i.e. fluid dynamics) of the fuel injector are based on geometrical variables (e.g. cross-sectional areas, lengths, diameters, angles, etc.). Therefore, prior to forming a fuel injector, it is inherent that these variables have been predetermined by the designer(s) to yield specific flow characteristics in the finish product.

Regarding claims 1-2, it is inherent that one of ordinary skill in the art is capable of forming the fuel injector seat of Claxton.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Yuji or Claxton.

Yuji and Claxton disclose the invention cited above. However, neither reference disclose specific included angle values nor ratio of the first-transverse cross-sectional area over the first area.

Neither reference specifically discloses the included angles values claimed by Applicant. However, n both references the first angle appears to be in the neighborhood of 90 degrees. Furthermore, in both references the first angle is greater than the second angle. The angles affect the flow through the injector.

Similarly, neither reference specifically discloses a ratio of the first-transverse cross-sectional area over the first area. This ratio is equal to the outer (i.e. larger) diameter of the sealing portion over the diameter of the orifice portion. Again, the dimensions of the passageways affects the mass flow through the injector.

Therefore, regarding claims 3-4, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected specific diameters and included

angles of the fuel injector of either Yuji or Claxton, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Yuji or Claxton in view of GB 2 151 516 to Sasao et al.

Yuji and Claxton disclose the invention cited above. Furthermore, Yuji disclose the step of grinding or lapping the sealing portion to provide a select finish. However, neither reference disclose using a grinding tool.

Sasao et al disclose a method of forming a valve seat (10a) by a burnishing operation using a rotary burnishing tool (17) to provide a select finish on the sealing portion. They also disclose that it is known to use a rotary grinding tool (f) in the prior art. Sasao et al invention uses a burnishing tool (17) rather than a grinding tool in order to "burnish[] the hollow surface to its finished size and harden[] the material at the surface of the hollow interior" (col 2, lines 105-108). The burnishing tool, nonetheless, improves the finish of the valve seat. As shown in Figure 4 the rotatory burnishing tool (17) is rotated about an axis of rotation that coincides with the axis of the fuel injector seat. Furthermore, the tool includes an apex (17b) such that the tool burnishes the seat (10') simultaneous with the guide bore (9).

Regarding claims 5-6, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have including a step of finishing the surface of the sealing portion in the

methods of either Yuji or Claxton using a grinding (or burnishing) tool, in light of the teachings of Sasao et al, so that "the finishing accuracy can be improved" (col 4, lines 87-88).

Regarding claim 7, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have provided the grinding tool with an apex , in light of the teachings of Sasao et al, so that the transition portion can be grinded simultaneously with the sealing portion.

Regarding claims 8-10, although select finishes of 0.2-0.5 micrometers are not explicitly disclosed by the references cited, Official Notice is taken that grinding to such a finish is known in the art of manufacturing valve seats.

Prior Art References

11. The prior art references listed on the enclosed PTO-892, but not used in a rejection of the claims, are cited for their teachings of forming fuel injectors.

Contact Information

12. Official documents related to the instant application may be submitted to the Technology Center 3700 mail center by facsimile at (703) 305-3579/3580. Should Applicant desire to submit a DRAFT response to the Examiner by facsimile transmission, then Applicant should contact the Examiner at the number below for instructions concerning the transmission of DRAFT documents. Applicant is reminded to clearly mark any facsimile transmission as "DRAFT" if it is not to be considered as an official response.

13. Any inquiry concerning this communication should be directed to Examiner Eric Compton at telephone number (703) 305-0240.

ebc E.C

April 30, 2001

S. THOMAS HUGHES
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700